§P.6 p. 57 (7, 14, 26, 30, 32, 38, 42, 51, 52)

Korpi
Period 3.14

(7) write as a+bi

$(i^2+3)-(7+i^3)$

$(-1+3)-(7+i^2\cdot i)$

$2-(7+-i)$

$2-7+i$

$\boxed{-5+i}$

(14) $(\sqrt{-4}+i)(6-5i)$

$(2i+i)(6-5i)$

$3i(6-5i)$

$18i-15i^2$

$18i-15(-1)$

$18i+15$

$\boxed{15+18i}$

(26) $(1-i)^3$

$(1-i)^2(1-i)$

$(1-2i+i^2)(1-i)$

$(1-2i-1)(1-i)$

$-2i(1-i)$

$-2i+2i^2$

$-2i+2(-1)$

$-2i-2$

$\boxed{-2-2i}$

(30) $(5-6i)\overset{\text{conjugate}}{(5+6i)}$

$25-30i+30i-36i^2$

$25-36(-1)$

$25+36$

$\boxed{61}$

(32) $(-1-\sqrt{2}\,i)\overset{\text{conjugate}}{(-1+\sqrt{2}\,i)}$

$1-\sqrt{2}i+\sqrt{2}i-2i^2$

$1-2(-1)$

$1+2$

$\boxed{3}$

(38) $\dfrac{(2-i)(1+2i)}{(5+2i)}$

$\dfrac{2+4i-i-2i^2}{5+2i}$

$\dfrac{2+3i-2(-1)}{5+2i}$

$\dfrac{4+3i}{5+2i}\cdot\left(\dfrac{5-2i}{5-2i}\right)$

$\dfrac{20-8i+15i-6i^2}{25-4i^2}$

$\dfrac{26+7i}{29}$

$\boxed{\dfrac{26}{29}+\dfrac{7}{29}i}$

(42) Solve:

$3x^2+x+2=0$

$x=\dfrac{-1\pm\sqrt{1^2-4(3)(2)}}{2(3)}$

$x=\dfrac{-1\pm\sqrt{-23}}{6}$

$\boxed{x=-\frac{1}{6}\pm\frac{\sqrt{23}}{6}i}$

(51) (a)
- $i=i$, $i^2=-1$, $i^3=-i$
- $i^4=(i^2)^2=(-1)^2=1$
- $i^5=i$, $i^6=i^2=-1$
- $i^7=i^4\cdot i^3=i^3=-i$
- $i^8=(i^4)^2=(1)^2=1$

(b)
- $i^{-1}(1)=i^{-1}(i^4)=i^3=-i$
- $i^{-2}\cdot i^4=i^2=-1$
- $i^{-3}\cdot i^4=i$
- $i^{-4}\cdot i^4=i^0=1$
- $i^{-5}\cdot i^8=i^3=-i$
- $i^{-6}\cdot i^8=i^2=-1$
- $i^{-7}\cdot i^8=i$
- $i^{-8}\cdot i^8=i^0=1$

(c) $i^0=1$

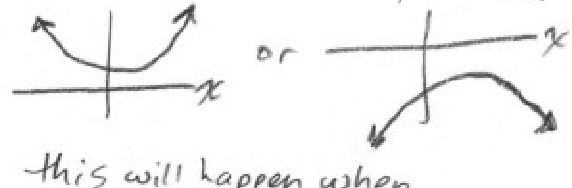
(d) The powers of i repeat every 4th power. i^{4n} (mult. of 4) are equal to one and can be used to eliminate neg. exponents. Any power of i can alway be written with, at most, i'.

(52) $f(x)=ax^2+bx+c$

when $a,b,c\in\mathbb{R}$

and $ax^2+bx+c=0$ has nonreal (imaginary) complex solns.

* For this to happen, the parabola will have no X-intercepts on the Cartesian plane, existing entirely above or below it, for ex.



this will happen when a, b, c are either all positive (up) or all negative (down)

—Korpi